

In the Specification

Please add the following paragraph at page 4, line 26:

Fig. 14 is a table illustrating an arrangement of the teeth into ensuing teeth groups in a preferred embodiment.

Please replace the paragraph beginning at page 5, line 16 with the following paragraph:

The armature core 8 has teeth 8a, the number of which is twelve in this embodiment. Also, the number of the coils 9 is twelve in this embodiment. Each tooth 8a (i.e., A,B,C,D,E,F,G,H,I,J,K,L) has a bar at the distal end. The tooth bars extend in the circumferential direction. In this embodiment, each consecutive five teeth 8a form a group (Group No. 1 [A,B,C,D,E]), and there are twelve groups of the teeth 8a as shown in Figure 14. Specifically, any one of the teeth 8a (tooth A) is located at the most forwarding advancing position in the rotation direction in one of the teeth groups (Group No. 1), and the tooth 8a at the second most forwarding advancing position in this group (tooth B) is also the most forwarding advancing tooth 8a in the next group (Group No. 2 [B,C,D,E,F]). In this manner, each tooth 8a is defined as the most forwarding advancing tooth to the most trailing tooth 8a, or the first to fifth tooth 8a, in five consecutive teeth groups. Each group comprises five teeth including the first to fifth tooth. The first tooth is the most forwarding tooth and the fifth tooth is the most trailing tooth. Each coil 9 is wound about one of the teeth groups. Only one of the coils 9 is shown in Fig. 1.

Please replace the paragraph beginning at page 7, line 9 with the following paragraph:

The circumferential length of the main portion 2a is determined to correspond to this angle. When the circumferential center of the first tooth 8a in each teeth group is aligned with the most forwarding advancing end 2d of the main portion 2a in the rotation direction of the armature 4 as shown in Fig. 1, the most trailing end 2e of the main portion 2a is aligned with the circumferential midpoint between the fifth tooth 8a and the fourth tooth 8a in the teeth group.

Please replace the paragraph beginning at page 8, line 1 with the following paragraph:

As shown in Fig. 2, when ~~When~~ the forwarding advancing end of the bar of the first tooth 8a is aligned with the border 10 of the thin part 2c and the main portion 2a during rotation of the armature 4 ~~as shown in Fig. 2~~, one of the brushes 6, which is connected to one of the pairs of the segments 5a, starts contacting the adjacent segment 5a. The connecting point of the segment 5a and the coil 9 is indicated by a dot in Fig. 1. This starts commutation of the corresponding coil 9. In other words, the bar of the first tooth 8a starts approaching ~~contacting~~ the thin part 2c at the moment when commutation of the brush 6 is started.

Please replace the paragraph beginning at page 8, line 12 with the following paragraph:

When the armature 4 rotates by a certain angle from the state of Fig. 2 and reaches the state of Fig. 1, and one of the pairs of the segments 5a contacts one of the brushes 6 in the substantially same areas, the flowing direction of current through the coil 9 is changed. At this time, the most forwarding advancing end 2d of the main portion 2a is aligned with the circumferential center of the first tooth 8a, and the most trailing end 2e is aligned with the circumferential midpoint between the fifth tooth 8a and the fourth tooth 8a. When the armature 4 further rotates by a certain angle from the state of Fig. 1, commutation is suspended. The section angle of commutation is therefore thirty-degree angle.

Please replace the paragraph beginning at page 9, line 15 with the following paragraph:

(1) At the beginning of commutation, the distal end of the first tooth 8a is aligned with the first weak flux part (thin part 2c). In other words, the positions of the brushes 6 are determined such that each brush 6 forms a short circuit in one of the pairs of the segments 5a when the forwarding advancing end of the bar of the first tooth 8a is aligned with the first weak flux part 2c.

Please replace the paragraph beginning at page 10, line 18 with the following paragraph:

Therefore, when commutation is started, the forwarding advancing end of the bar of the first tooth 8a is reliably aligned with the border of the thin part 2c

(3c) and the main portion 2a (3a) of the magnet 2 (3). In other words, when the forwarding advancing end of the bar of the first tooth 8a is aligned with the border of the thin part 2c (3c) and the main portion 2a (3a) of the magnet 2 (3), commutation is reliably started.

Please replace the paragraph beginning at page 11, line 13 with the following paragraph:

The armature core 18 has teeth 18a, the number of which is twelve in this embodiment. Also, the number of the coils 19 is twelve in this embodiment. Each tooth 18a has a bar at the distal end. The tooth bars extend in the circumferential direction. In this embodiment, each consecutive five teeth 18a form a group, and there are twelve groups of the teeth 18a as shown in Fig. 14. Specifically, any one of the teeth ~~8a~~ 18a is located at the most forwarding advancing position in the rotation direction in one of the teeth groups, and the tooth 18a at the second most forwarding advancing position in this group is also the most forwarding advancing tooth 18a in the next group. In this manner, each tooth 18a is defined as the most forwarding advancing tooth to the most trailing tooth 18a, or the first to fifth tooth 18a, in five consecutive teeth groups. Each group comprises five teeth including the first to fifth tooth. The first tooth is the most forwarding tooth and the fifth tooth is the most trailing tooth. Each coil 19 is wound about one of the teeth groups. Only two of the coils 19 are shown in Fig. 4.

Please replace the paragraph beginning at page 12, line 35 with the following paragraph:

When the circumferential center of the first teeth 18a is aligned with the most forwarding advancing end 12f of the main portion 12a, the most trailing end 12g is aligned with the circumferential center of the fifth tooth 18a.

Please replace the paragraph beginning at page 13, line 5 with the following paragraph:

Referring to Fig. 4, when the circumferential midpoint of the first tooth 18a and the tooth 18a that is located at the forwarding advancing side of the first tooth 18a is aligned with the border of the most forwarding advancing portion 12f

and the extended portion 12b, the most trailing end 12g of the main portion 12a is aligned with the circumferential midpoint between the fifth tooth 18a and the fourth tooth 18a.

Please replace the paragraph beginning at page 13, line 23 with the following paragraph:

A second weak flux part, which is a second thin part 12d, is formed at a location that is away from the most forwarding ~~advaneing~~ portion 12f by an angle that is equal to the slot angle θ multiplied by an integer number m , or an angle $m\theta$. In this embodiment, the second thin part 12d is away from the angle 2θ (60°) from the most forwarding ~~advaneing~~ portion 12f in the clockwise direction. The second thin part 12d extends in a range of 30° . When the circumferential midpoint between the first tooth 18a and the tooth 18a that is at the forwarding ~~advaneing~~ side of the first tooth 18a is aligned with the border of the first thin part 12c and the main portion 12a the second thin part 12 d is aligned with the third tooth 18a.

Please replace the paragraph beginning at page 14, line 23 with the following paragraph:

When the forwarding ~~advaneing~~ end of the bar of the first tooth 8a is aligned with the border of the first thin part 12c and the main portion 12a during rotation of the armature 14 as shown in Fig. 5, one of the brushes 16, which is connected to one of the pairs of the segments 15a, starts contacting the adjacent segment 15a. This starts commutation of the coil 19. In other words, the bar of the first tooth 18a starts approaching ~~contacting~~ the first thin part 12c of the magnet 12 at the moment when commutation of the brush 16 is started. At this time, the forwarding ~~advaneing~~ end of the bar of the third tooth 18a is aligned with the second thin part 12d of the magnet 12.

Please replace the paragraph beginning at page 17, line 14 with the following paragraph:

The motor of the embodiment of Figs. 1 to 3 may be modified in a first modification as illustrated in Fig. 7. In the embodiment of Fig. 7, the length of the main portion 22a (23a) of magnet 22 (23) corresponds to a predetermined

angle $\delta 1$. The angle $\delta 1$ is determined such that the most trailing end 22e (23e) of the main portion 22a (23a) is aligned with the forwarding advancing end of the bar of the fifth tooth 28a when the circumferential center of the first tooth 28a faces the most forwarding advancing portion 22d (23d) of the main portion 22a (23a). The angle $\delta 1$ is represented by the following equations with the angle θ .

Please replace the paragraph beginning at page 17, line 28 with the following paragraph:

In the equations, the sign n represents the number of the bars of teeth in a teeth group, and the sign t represents an angle that corresponds to the distance between the trailing end of the bar of a tooth 28a and the forwarding advancing end of the bar of the adjacent tooth 28a. In this embodiment, when commutation of one of the coils 29 is started, the most trailing end 22e (23e) of the main portion 22a (23a) is relatively away from the circumferential center of the fifth tooth 28a. This reduces the cogging torque of the motor 21. Accordingly, the motor 21 operates smoothly with low noise.

Please replace the paragraph beginning at page 18, line 4 with the following paragraph:

The motor of the embodiment of Figs. 1 to 3 may be modified in a second modification as illustrated in Fig. 8. In the embodiment of Fig. 8, the length of the main portion 32a (33a) corresponds to a predetermined angle $\delta 2$. The angle $\delta 2$ is determined such that the most trailing end 32e (33e) is aligned with the trailing end of the bar of the fourth tooth 38a when the most forwarding advancing portion 32d (33d) is aligned with the circumferential center of the first tooth 38a. The angle $\delta 2$ is represented by the following equations with the angle θ .

Please replace the paragraph beginning at page 18, line 16 with the following paragraph:

In the equations, the sign n represents the number of the bars of teeth in one teeth group, and the sign t represents an angle that corresponds to the distance between the trailing end of the bar of a tooth 38a and the forwarding advancing end of the bar of the adjacent tooth 38a. In this embodiment, when commutation

of one of the coils 39 is started, the most trailing end 32e (33e) of the main portion 32a (33a) is relatively away from the circumferential center of the fifth tooth 38a. This reduces the cogging torque of the motor 31. Accordingly, the motor 31 operates smoothly with low noise.